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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,984	11/12/2003	Jason K. Shiepe	PES-0069	2983
23462	7590	12/06/2006		
CANTOR COLBURN, LLP - PROTON 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			EXAMINER WILKINS III, HARRY D	
			ART UNIT	PAPER NUMBER

1742

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/605,984	Applicant(s) SHIEPE, JASON K.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

1. The rejection under 35 USC 102 based on Fronk et al has been withdrawn in view of Applicant's amendment to claim 1 requiring a specific amount of elemental carbon within the coating.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 1, 4-6 and 26 and a rejected under 35 U.S.C. 103(a) as being unpatentable over Fronk et al (US 6,372,376).

Fronk et al teach (see abstract, figures 1 and 3-4 and cols. 2-5) an electrochemical cell including a membrane electrode assembly (4 or 6) (first and second electrodes and a membrane disposed between and in fluid communication with the electrodes), a first cell separator plate (14 or bottom side of 8) opposing the first

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electrode and defining a first flow field there between with the first flow field being proximate to a first frame member (26 or 30), a second cell separator plate (16 or top side of 8) opposing the second electrode and defining a second flow field there between with the second flow field being proximate to a second frame member (32 or 28). Fronk et al call the separator plates "contact elements", but the structures are identical and perform the same function as Applicant's disclosed "separator plates". Fronk et al teach that the separator plates were coated with an electrically conductive, corrosion resistance material having a resistivity below 50 ohm-cm. Preferably the coating was a mixture of graphite and carbon black impregnated in a resin binder.

Fronk et al does not teach a specific range for the desired amount of elemental carbon, but does disclose (see col. 4, lines 65-67) that the coatings typically contained 25 wt% carbon/graphite and a specific example (see col. 6, lines 20-51) that contains 38 wt% carbon/graphite. Fronk et al additionally does not disclose a ratio between the amounts of graphite and the amounts of carbon black utilized within the coating.

Although the examples of Fronk et al are not within the presently claimed range, one of ordinary skill in the art would have been motivated to determine the optimal amounts and ratio of graphite and elemental carbon to add to the coating for maximizing conductivity, while still retaining adequate corrosion resistance. Therefore, Fronk et al is considered to present a *prima facie* case of obviousness against the present claims. Applicant has failed to demonstrate any unexpected result within the presently claimed range of elemental carbon content or for the claimed ratio of graphite to carbon black. See MPEP 2144.05.

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Regarding claims 4-6, Fronk et al teach (see col. 2, lines 35-51) that the IR drop within the cell should be minimized. The resistivity of the coating directly affected the IR drop in the electrical cell by causing voltage loss due to resistance. Thus, Fronk et al clearly suggest to one of ordinary skill in the art to make the coating to have as low a resistance as possible. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the applied coating in order to have minimized the resistance of the coating. Further the resistivity of the carbon black/graphite/resin binder of Fronk et al is considered to be less than 1 ohm-cm because the mixture of carbon black/graphite/resin binder described by Fronk et al is substantially identical to the disclosed mixture of carbon black/graphite/resin binder such that one of ordinary skill in the art would have expected the coating of Fronk et al to have the same properties as claimed.

Regarding claim 26, Fronk et al disclose the claimed structure. Applicant has failed to demonstrate that the recited methods produced a materially different coating than the coating of Fronk et al. Further, Fronk et al suggest a surface of an electrochemical cell having an electrical resistivity of less than 10 ohm-cm.

5. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fronk et al (US 6,372,376) in view of Shiepe et al (US 6,365,032).

The teachings of Fronk et al are described above.

However, Fronk et al fail to teach a pressure pad disposed proximate to the second cell separator plate and retained by a pressure pad separator plate, and wherein the pressure pad separator plate contained the elemental carbon coating.

Shiepe et al teach (see col. 1, line 20 to col. 2, line 5) using a pressure pad and a pressure pad separator plate (protective encasing) for the purpose of maintaining uniform compression in the cell active area which ensured that the electrodes maintained intimate contact with the flow fields over long periods of time.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a pressure pad and a pressure pad separator plate as taught by Shiepe et al to the electrochemical cell of Fronk et al because the pressure pad and pressure pad separator plate provided intimate contact between the electrodes and the fluids flowing within the flow fields to ensure operability of the electrochemical cells for a long period of time.

Further, it would have been obvious to one of ordinary skill in the art to have applied the carbon black/graphite/resin binder coating of Fronk et al to the pressure pad separator plate because the coating of Fronk et al improved conductivity of the electrochemical cell (i.e.-improved efficiency) as well as improved corrosion resistance. Since the current within the cells of Fronk et al and Shiepe et al must flow through and/or around the pressure pad taught by Shiepe et al, it would have been obvious to one of ordinary skill in the art to have provided the pressure pad with the coating of Fronk et al to permit higher through-put of electricity (by lowering overall resistance and/or increasing current flow path size) in the cell to reduce IR losses, thereby improving overall efficiency.

Regarding claim 3, Fronk et al fail to teach first and second flow field members, wherein one or both were coated with the elemental carbon coating.

Shiepe et al teach (see col. 1, line 20 to col. 2, line 5) using flow field members (110, 112).

It would have been obvious to one of ordinary skill in the art to have added the flow field members as taught by Shiepe et al in combination with the pressure pad of Shiepe et al to the cell of Fronk et al because the flow field members provided support to keep the compression of the cell from breaking the support plates when the compression was applied.

Response to Arguments

6. Applicant's arguments filed 26 October 2006 have been fully considered but they are not persuasive. Applicant has argued that Fronk et al does not teach the claimed ranges of weight ranges of elemental carbon (carbon black and graphite) or the weight ratio between carbon black and graphite.

In response, Fronk et al provides exemplary amounts of elemental carbon addition, but provides no strict limited ranges. Thus, one of ordinary skill in the art would have been led to optimize the coating composition in order to determine the proper composition for achieving the desired balance of lower resistivity and higher corrosion resistance. Applicant has failed to provide or even assert any sort of unexpected result based on the presently claimed ranges to establish a basis for showing non-obviousness over the disclosure of Fronk et al.

Additionally, Applicant argued that there is no suggestion in the combination of Fronk et al and Shiepe to add the coating of Fronk et al to the pressure pad of Shiepe

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since the pressure pad was not in the reaction field proximate the membrane-electrode-assembly.

In response, see the above rejection grounds showing why one of ordinary skill in the art would have been motivated to add the coating of Fronk et al to the pressure pad of Shiepe et al.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

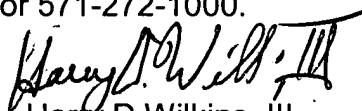
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw